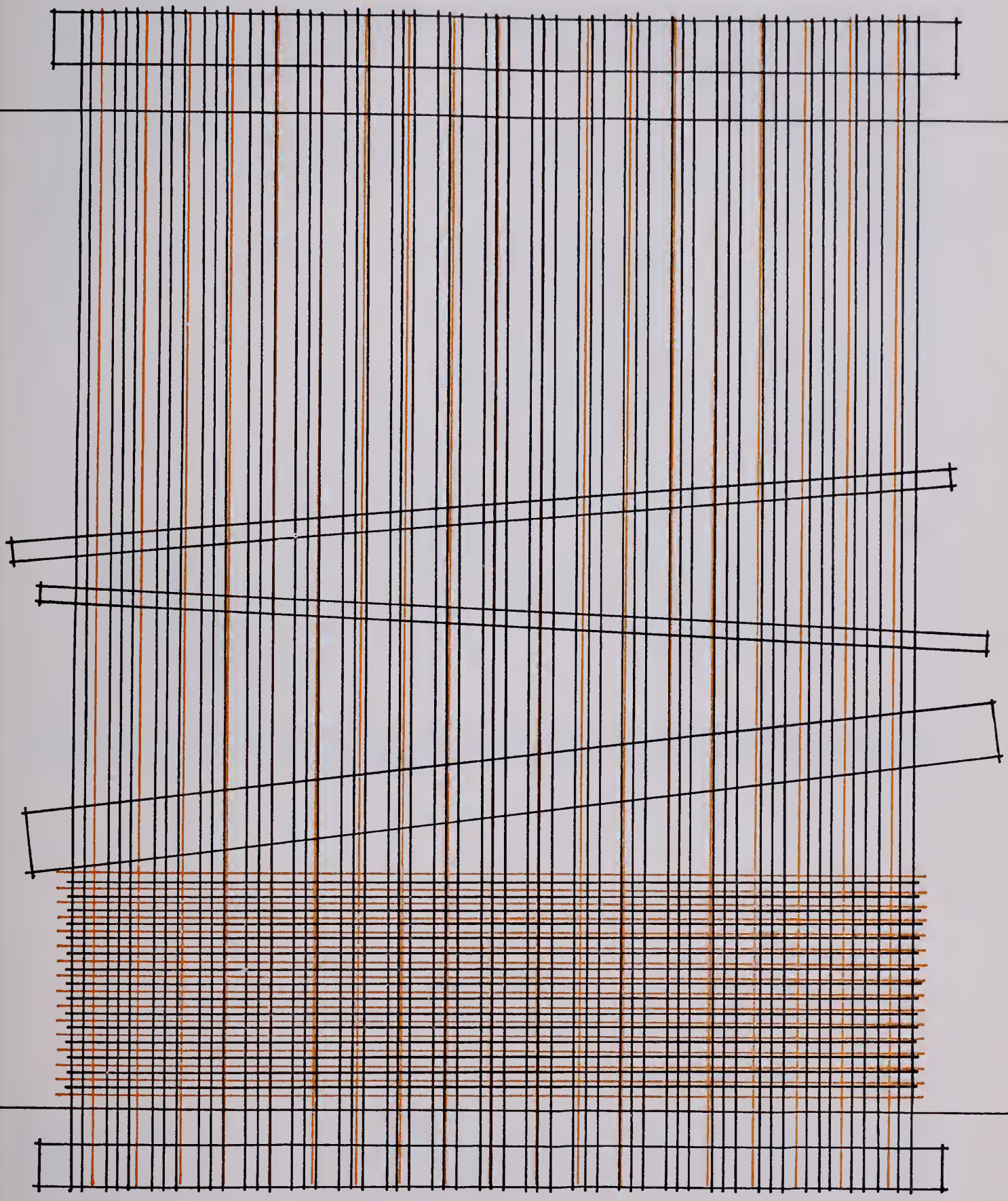
1960

# The Bobbin and Beaker Vol. 18 No. 1

Clemson University

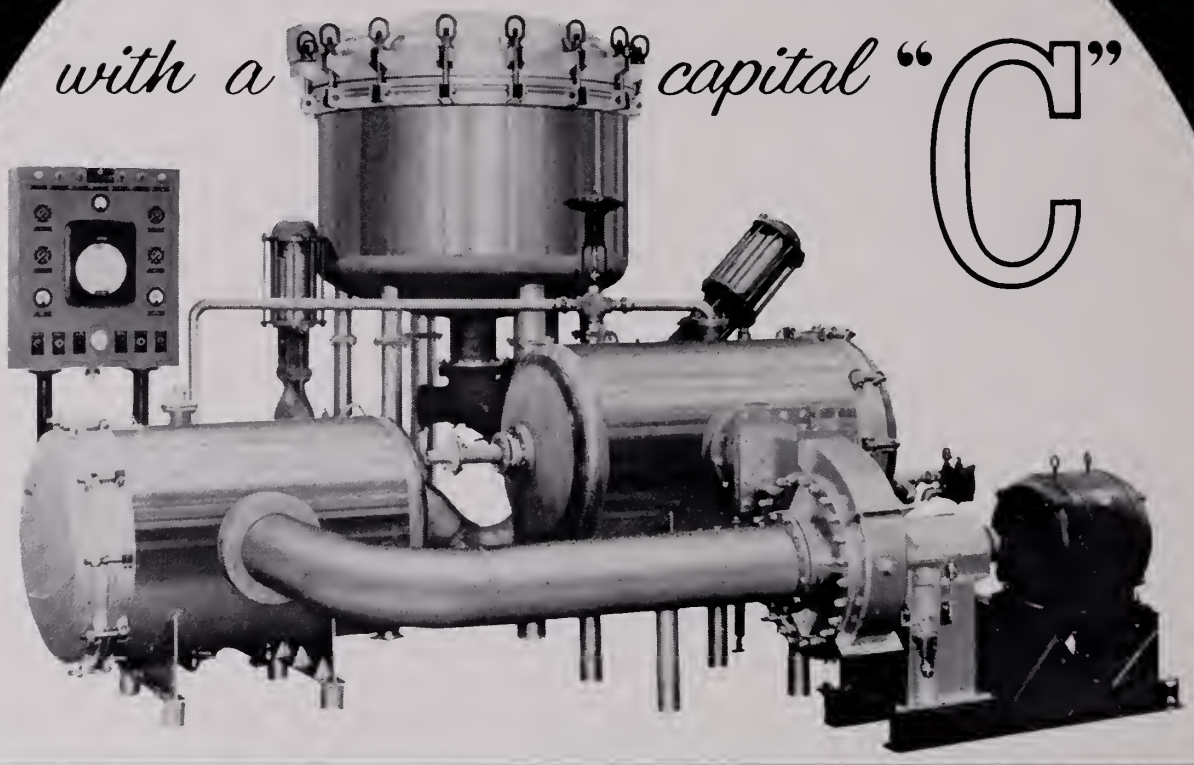


# BOBBIN & BEAKER

CLEMSON COLLEGE FALL 1960

# COST CUTTING

*with a capital "C"*



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THE

# Bobbin & Beaker

Official Student Publication
Clemson Textile School

VOL. 18 FALL ISSUE 1960 NO. 1

## The Staff



## In This Issue



**THE BOBBIN & BEAKER.** Organized in November, 1939, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge four times during the school year by students of the Clemson College School of Textiles. 

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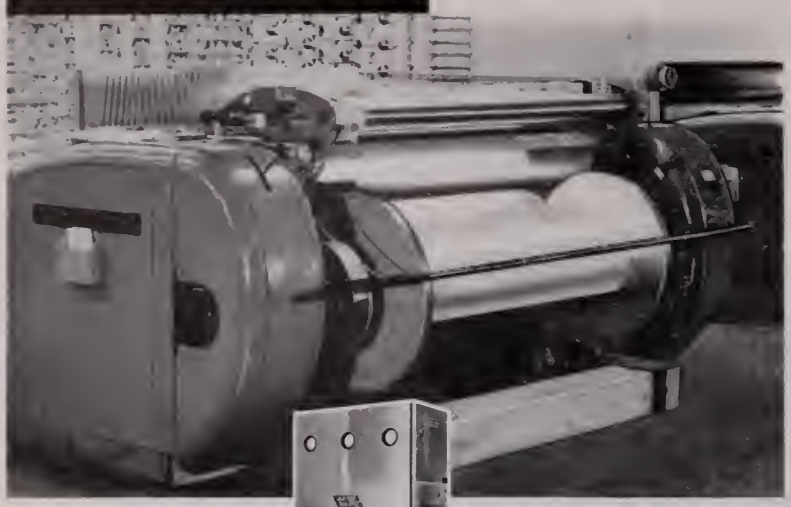

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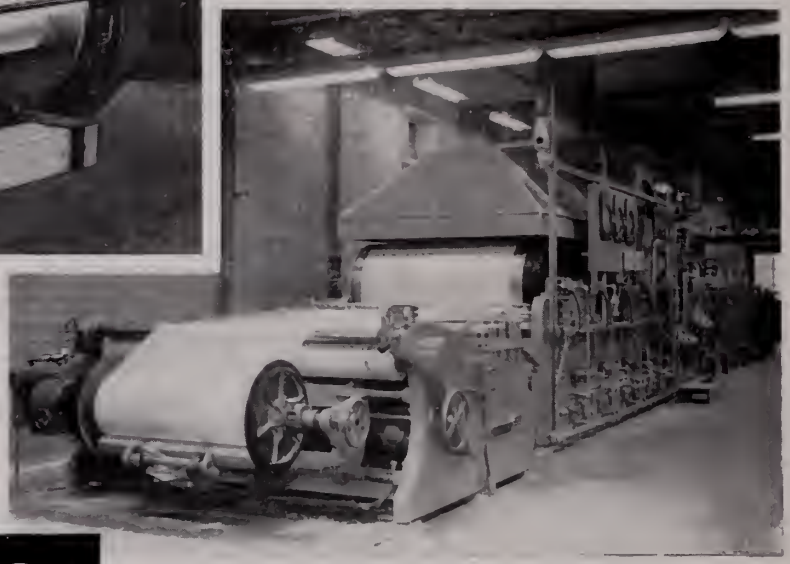

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# from the Editor

In this issue we have a very informative article on Textile Research at Clemson. This article on research is the first of several to be presented in future issues.

Waste control, a problem of great importance in the textile industry, is the subject of another interesting article in this issue.

The 1960-61 BOBBIN AND BEAKER staff seated from left to right: Ray Brock, Managing Editor; Tommy Ariail, Editor; Harral Young, Business Manager; Standing, Lewis Kay, Circulation Manager; David Rodgers, Advertising Manager.

# Textile Research At Clemson College

By
David Gentry
Assistant Textile Technologist

A college or university exists for only two purposes: study and instruction. Of course, instruction is the phase with which undergraduates are most familiar since it deals with education and training. Yet, there must be provision for the re-examination of existing knowledge and the exploration of new areas in search of new facts. The college's other purpose enters here because a studious atmosphere which facilitates systematic study or research is provided. Here, then, is a college's purpose which is not encountered often by the undergraduate and which, at first glance, may seem incongrous with the seemingly only purpose of a college, that of education.

Since one of the ten textile schools in this country is located at Clemson, it is logical that Clemson College should promote research in textiles. It is a well-established fact that research has been the key to growth in all industries, and the textile industry is no exception. Research is assuming a growing importance in our industry because the low profit margin of textile manufacturer's necessitates the continual improvement of a company's competitive position if it is to survive. The three objectives of applied research—reducing cost, improving quality, and increasing productivity — furnish the manufacturer with information by which he can become more competitive. There is also a great need for basic research in textiles because there are many unanswered questions and unknown relationships in processing technology. It is encouraging to see increasing interest in basic textile research since this information is inherently the foundation for all real and revolutionary improvements which must come in the next decade. Many conclusions drawn in the past have been invalidated through experience or additional research simply because some basic relationship was unknown or ignored.

Textile research at Clemson is no new activity. Since the school's beginning, research and testing services have been furnished to the industry, and as a result, many improvements have been forthcoming. There have been a variety of improvements in textile machinery and developments of new and unusual concepts in processing technology. In processing, a notable contribution has been made in the electrostatic opening of cotton. Other developments have been accomplished in the design and development of textile testing instruments. Worthy of mention is the development of the Clemson Flat Bundle Tester, an instrument for determining the tensile strength of cotton fibers. Other efforts in improving fiber property measurements have been made and have usually been reported in such leading publications as the **Textile Research Journal.**

Because of an excellent Textile Chemistry Department, much research has also been done in the area of wet processing. Research in bleaching has benefited the industry through improvements in processing, while research conducted on small scale bleaching and finishing of cottons has supplied the industry with much-needed standards. Other important work dealing with the application of resin finishes to cotton goods has been a source of improvement in the wrinkle resistant properties of wash-and-wear fabrics.

All of this earlier research work has generally been performed by professors in the School of Textiles during summer months or other periods when the professor may not have had a full teaching load. Support for this work has come from the Sirrine Foundation, private industry, and the United States Department of Agriculture.

With the demand for textile research services increasing, the Dean of the Textile School, along with other members of the College administration, felt this demand could best be met through the organization of a Textile Research Department. Such a department was organized in 1958 and has now developed a full-time professional staff for preparing and supervising projects. This group is supported by a staff of laboratory and manufacturing technicians who carry out routine tasks. Both groups have continually expanded to keep pace with the increasing amount of work that has been forthcoming. Such

expansion is necessary to keep research work from being "mass produced", a factor which degrades the quality of the work done.

All of the work of the Textile Research Department is sponsored by private industry, foundations, and agencies of the state and federal governments. Large concerns with their own research departments as well as small concerns with limited or no research facilities have been served by the department.

The research staff is balanced over the various manufacturing phases of textiles so that projects in every area can usually be handled. In addition, the staff has available for consultation professional people in the technical areas of the entire College.

The physical facilities of the Textile Research Department have been developed and improved considerably since its beginning. Presently available are two processing laboratories in which temperature and humidity can be closely controlled. The availability of such space has been an asset in securing contract research work. Also at the research staff's disposal are two physical testing labs, fully air-conditioned, which are equipped with the latest electronic testing equipment as well as standard equipment which has been used in textile testing for many years. These testing instruments are valued in excess of $60,000 and do not include X-ray and microscopic equipment which is used, at present, only to a limited extent. Plans for individual laboratories for each of the Textile Chemists have been drawn up and construction should begin within the next few months.

Projects are currently underway which include evaluation of new physical testing methods, modifications in yarn processing, improvements in slashing techniques and weaving, and new techniques and processes in finishing. One project of interest is the development of stretch cotton yarns suitable to compete with the synthetic textured yarns used in hosiery and other wearing apparel. This project is sponsored by the United States Department of Agriculture through its Southern Regional Laboratory and will continue for some three years. Also, there are currently underway projects to improve the slashing of cotton yarns and to eliminate stream pollution problems created by the use of starch. In the very near future, work will be begun to evaluate the weaving performance of and properties of fabrics made from yarns spun in the USDA Pilot Plant located at Clemson.

The outlook for Textile Research at Clemson is bright. The industry leaders have begun to realize that the old "rule-of-thumb" methods once used are no longer adequate and are demanding research services. With its well-qualified personnel, modern equipment, and excellent physical facilities, Clemson is able to supply superior research services not found in any other institution.

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## Dr. Martin Chanin

Dr. Chanin was born in Newark, N. J. He was graduated from High School in Newark and from there attended the University of Pennsylvania. He received his B. A. in Chemistry in 1942.

After graduation, Dr. Chanin worked for Hoffman-La Roche, a chemical manufacturing firm in Nutley, N. J., as a Junior Chemist.

After this, he enrolled in graduate school at the University of Michigan where he received his Master of Science degree in 1944 and his PhD in Pharmaceutical Chemistry in 1946.

Since this time Dr. Chanin has held many responsible positions such as Research Chemist for Humko (Memphis, Tenn.), Research Biochemist at the City of Hope Medical Center (Duarte, Calif.) and as a professor at four colleges. The colleges in which he has taught are Memphis State, Detroit Institute of Technology and Evansville College. At present, "Doc" is Professor of Textile Chemistry at Clemson where he teaches several courses both on the graduate and undergraduate levels.

He is, and has been, a member of several honorary and many professional societies.

Dr. Chanin is married to the former Dr. Margaret E. Jones, D. D. S. They have two sons, Phillip, age 12 and Bobby, 10.

## Dr. Paul Edward Robbins

Dr. Robbins, the newest addition to the Textile Chemistry Staff, was born in Camden, New Jersey. He was graduated from High School in Haddonsfield, N. J.

In 1952 Dr. Robbins received his B. S. degree in Chemistry from the University of Pennsylvania. His graduate studies were conducted at the Georgia Institute of Technology where, in 1956, he received his PhD in Organic Chemistry.

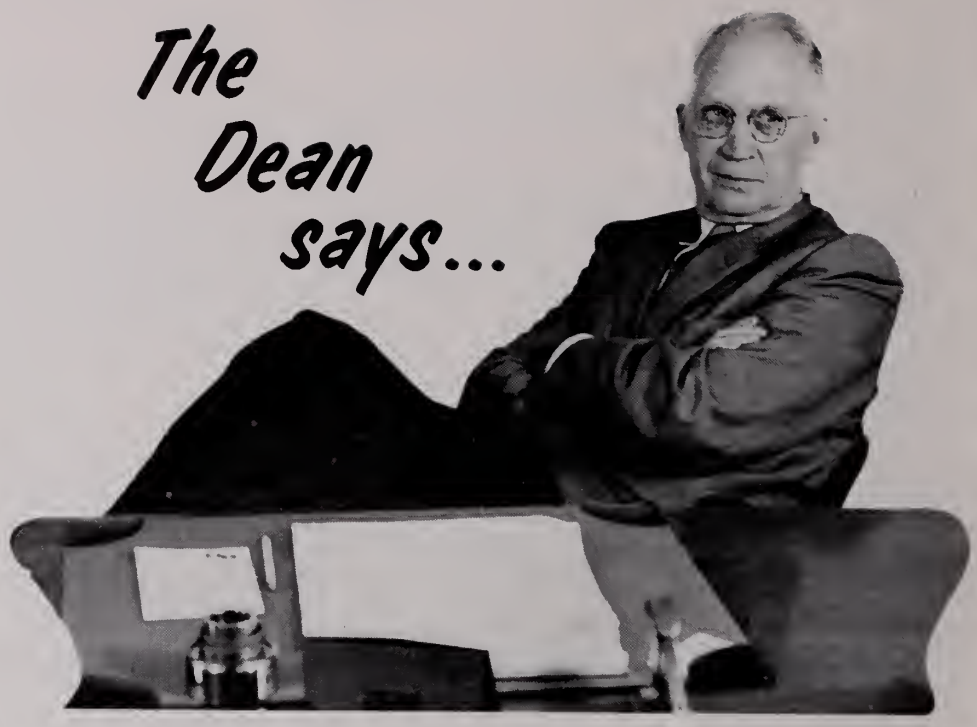
During his college days, Dr. Robbins was a member of Phi Lambda Epsilon, honorary chemistry fraternity, and Sigma Xi, honorary research fraternity.

Since his graduation, Dr. Robbins has held the position of Research Chemist in the Cellophane Research and Development Laboratory in the Richmond, Va., plant of E. I. Du Pont de Nemours & Co.

At present, Dr. Robbins holds the positions of Assistant Professor of Textile Chemistry and Assistant Textile Chemist at the Clemson College School of Textiles. Although most of his time will be spent in research, he plans to teach courses in Cellulose Chemistry and Polymers to graduate students.

Dr. Robbins is married to the former Miss Gladys Cordray. They have one child, Paul David, 14 months old.

# The Dean says...



We are encouraged with the Freshman enrollment in the School of Textiles. Last September's new student enrollment in Textiles was 56, this September the new student enrollment fas 79, an increase of 41 percent. The total enrollment in Textiles is 300 this year compared to 266 last year. We had our smallest graduating class since the war in 1960. It looks like we are over the hump and headed in the right direction.

James Bailey, Vice President of Judson Mills, is Chairman of the Clemson Liaison Committee of the South Carolina Textile Manufacturers Association. This Committee had a meeting at the College on October 1st to make plans for the year's work. This Committee has assumed the responsibility of putting the textile story, including career opportunities, before the high school students of South Carolina, their parents, and their teachers. Please give this Committee what help you can.

The J. E. Sirrine Textile Foundation held its annual meeting here on Oct. 1st. I wish to express to the readers of the Bobbin & Beaker my personal appreciation and that of the faculty for what the Foundation does for the School of Textiles. I actually do not see how we could keep going without the Foundation's support, both financial and in good will.

During the past year Professor Richardson was awarded his Master's degree by North Carolina State College and Professor Marvin was awarded his Master's degree by Georgia Tech.

Professor Bratton Williams has rejoined the Textile School faculty after several years loan to the mathematics department.

# Outstanding Seniors . . .

By
**William E. Barrineau, Jr.**

**THOMAS M. ARIAIL**

Thomas (Tommy) M. Ariail, age 21, is married and is presently living at Clemson. He is a Textile Engineering major. His hometown is Sevierville, Tennessee, where he has spent three summers working with the Cherokee Textile Mills, gaining valuable textile knowledge.

Tommy received the **Ada Hearne Foundation Scholarship,** which is a four year scholarship. With this aid and his summer's work, Tommy has been able to finance his way through college.

Thomas Ariail was an honor student the first semester of his sophomore year. He is editor of the "Bobbin and Beaker" and has served on the staff during his sophomore and junior years. He served in the NTMS during his sophomore and junior years, and at present he is President of the Club; **Phi Psi** during his junior year, of which he is now Vice-President; Council of Club Presidents during his junior and senior years; and Student Assembly, all go to make up Tommy's active college life.

**ALVIN A. ADAMS, SR.**

Alvin Aubry Adams, age 28, is married and has one son. He is a **Textile Management Major** from Union, South Carolina. Aubry worked with Monarch Mills, Union, South Carolina, from 1949 until 1951 and again from 1955 until 1957. He has also served four years with the United States Navy (1951-1955). During his summers from school, Aubry has continued his work with Monarch Mills.

Aubry was an honor student during all of his first two years at Clemson and a high honor student during his junior year. He belongs to the Union County Club and **Phi Psi,** of which he is presently President. Aubry also belongs to the NTMS.

During his years at Clemson, Aubry has received two scholarships: (1) Overseers Scholarship, (2) Owens - Corning Fiberglas Scholarship. Aubry is also on the G. I. Bill.

**JAMES L. ADAMS, JR.**

James L. Adams, Jr., age 21, is a Textile Science major from Spartanburg, South Carolina. He has spent five (5) summers working with Beaumont Manufacturing Company of Spartanburg.

James has been a high honor student during all of his years at Clemson. He is a member of Who's Who Among Students in American Universities and Colleges. He has won the Phi Eta Sigma Math award, the Chicago Tribune Silver Medal (R.O.T.C. award), the Quartermaster's Award (R.O.T.C. award) and the National Merit Award. James was a member of the Pershing Rifles during his sophomore year. He was a member of the Executive Sergeants (R.O.T.C. Club) during his junior year. He is a member of **Phi Eta Sigma, Phi Kappa Phi,** and **Phi Psi.** James is also in the advanced R.O.T.C. program.

He received the South Carolina Textile Manufacturing Scholarship, which pays 50% of his education.

# Waste Is Costly

**W. T. Eison, Superintendent**

**Excelsior Mill No. 3, Rutherfordton, N. C.**

In an operation where the raw material is approximately 60% of the final product cost, any waste of this raw material is very costly.

This is the case in woolen manufacturing and therefore much emphasis is put on waste education, waste reduction and waste reprocessing.

This wool waste occurs throughout the woolen manufacturing operation and close observation and control over this waste is necessary at all phases of the manufacturing process.

The first chance of waste occurs during the picking operation. Any wool that drops out of the picker and is not picked up right at that time usually winds up in the sweep pile that also contains a lot of dirt, oil and foreign matter. This waste at picking occurs because of incorrect settings on the picker, improper feeding of the picker or through failure of the operators to keep the area cleaned up around the picking area. When thinking about this waste we usually think that this small amount would not be enough to bother with, and that we would spend more time picking up, being cautious and concerned than the waste would be worth. When we think like this we need to remember that the loss of just one (1) pound of this wool would cost as much as an hour's pay of the average picker tender. If the production of our picker is 2000 lbs. an hour, just 0.5% loss of the stock through waste would amount in approximately 5 hours to a weeks' pay for the average operator.

In the picking operation the waste is at the lowest cost because at this time we lose only the value of the wool. As the wool is processed to the next operation we have added a picking cost to the wool cost and therefore any loss of the stock at this point represents an even greater loss.

A larger amount of waste usually occurs in the Carding operation than at any other manufacturing operation. This waste is represented by; (a) card waste; that is the fly from the card and the droppings from the cylinders and doffers, (b) card strips; that is the stock that becomes embedded in the wire of the workers, strippers, cylinders and doffers and has to be stripped out at regular intervals, (c) card roving; that is made while getting the card threaded up and on correct weight, and (d) card sweeps; that is represented by the waste swept up in the regular floor sweepings.

These four categories of waste represent a tremendous poundage figure and therefore a very high cost figure. This figure can easily reach 10% of a weeks' production. A weeks' carding production figure of 30,000 pounds would mean 300 pounds of waste combined in these four categories of waste. With a raw material cost of $1.20 per pound plus a picking cost of .02½¢ per pound, this poundage of waste would represent approximately $3,675 per week. We can easily see why this waste takes on much importance to everyone.

In the carding operation as in picking, much waste occurs because of the improper settings on the card, improper speeds of the cards or sections of the cards or improper tending of the card.

In the spinning operation we classify waste as; (a) spinning roving, which is roving that is delivered from the card as satisfactory roving but does not get spun into yarn, (b) spinning hard ends or threads, which is spun yarn but for some reason has to be pulled off the bobbin, (c) spinning sweeps, which are very short fibers or stock that falls out during the spinning operation and good roving or hard ends that are dropped on the floor instead of being placed in designated containers. The total spinning waste can easily reach 5% of the weeks' spinning production. If 28,000 lbs. of yarn is spun from the 30,000 lbs. of carded roving then this spinning waste would amount to approximately 1400 lbs. This waste is valued at the original raw material cost plus picking and carding cost. This spinning waste is less than half the amount occured during carding, but the value of this waste has increased considerably.

In the preparation department we get waste in the warping and the winding operations. This waste is

in the form of hard ends or threads. The poundage of this waste is small when compared to the poundage resulting from the other operations but the full value of spun yarn is now lost. This loss can very quickly amount to a considerable sum.

In weaving we have the same type of waste, that is, hard ends resulting from improper filling or warps.

In all these greige mill operations waste is always made by the operators repairing breaks in the roving or yarn during the operation. The greater the number of ends coming down in spinning or the greater the number of stops in weaving, the greater will be the amount of waste made.

Another big loss occurs when the roving or hard ends waste is not put into the designated waste containers by the operators but instead is dropped on the floor and automatically is collected and classified as floor sweeps. As we discuss more about the utilization and disposition of this waste we can see the significance of keeping the waste properly segregated.

This covers the types of waste and points of waste occurrence throughout the greige mill operation. We can see the seriousness of this waste to any operation. What can be done to overcome this great loss?

One way we can combat this costly item is by setting up for each and every operation, waste standards. These standards are engineered and based on the actual operation and conditions of each machine, and on experience of previous operations.

In the case of waste resulting from the carding operation a standard amount of card waste, card strips and card roving is established for each type of yarn blend. These standards are used as a measuring stick of an efficient operation. If the standard amounts of waste are not exceeded by the actual amounts of waste made then the operation is well within control. When these standards are exceeded by the actual, then further emphasis should be given to this particular operation in order to find the reason for exceeding the standard amount of waste.

These standards are often reviewed to make sure they are a true measure or yardstick of what amount of waste could be expected in an efficient, carefully watched operation.

How an operation measures up to the standards set up for it, is watched very closely by the supervision and employees of each department because they know how serious it is, and how costly it is to the plant for any operation to go beyond the bounds of the waste standards.

The second way that this waste loss can be overcome to some degree is by the re-utilization of this waste.

A certain percentage of clean card roving can be put back in the blend, as raw stock, at the blending operation when an identical blend is prepared for use. The only loss incurred on this roving is the picking and carding cost.

Other types of waste must be reprocessed before it can be used again in the future blends. The card waste must be dusted in order to remove as much foreign matter as possible. Only a small percentage of this can be put back in the blends because of the very short fibers and the impossibility of removing all the dirt and trash.

The hard end waste and weaving head ends (very short woven strips) are processed first through a rag picker or garnett machine and then through a waste card. After these two operations these hard ends are again in fiber form and a predetermined amount is put back in future blends at blending.

This waste must all be kept separate as to type and components of the yarn so that it can go back in identical blends.

In the case of the largest part of the hard ends, the picking through weaving operating cost is loss, plus the cost of reprocessing, plus the cost of what amount of waste is lost completely during reprocessing, in other words, the yield of the operation.

The card strips, and all sweeps, can not be used at all because of trashiness, excess oil and lack of spinable fibers present. These two categories represent complete loss of the raw material cost plus the operation costs.

The third avenue of escape from this waste is one that is taken as a last resort and one that represents a big loss in dollars to the plant. The waste can be sold to waste dealers that specialize in using these waste products in many different ways. This selling of waste is much better than losing it completely but for every pound of waste sold, the plant must suffer the loss of the original stock, plus the operation costs for this waste, less the amount that is received for this waste. Any similarity between the original stock price and the price obtained for the waste is impossible, because it is not there. The wool roving, which represents the best form of waste that we have from our operation, brings a waste price that is about 40% of the original raw stock price.

Floor sweeps, when they were put in the blender at the first of the manufacturing operation, represented the high per pound cost of wool, but to the waste dealer the top price is ½¢ per pound.

At this point we come back to the previous mentioned importance of putting waste in the correct containers, and not dropping it on the floor. In weaving, hard ends that are put in the containers provided for them, can be reprocessed and reused in future blends. Hard ends that are dropped on the floor automatically go out of the department as floor sweeps and the ½¢ per pound from the waste dealer is the only return possible. Also, the waste dealer will put more value on waste that is separated such as 100% Wool or Wool/Nylon than he will on waste classified as "mixed", when no one knows what fibers it contains.

An efficient woolen greige mill will in 6 months, produce enough waste to keep the plant operating for two complete weeks, if it could be all converted back to raw stock. In other words, the pounds of waste made in 6 months represents 2 weeks usage of wool by the plant.

In other comparison figures the pounds of waste made in 6 months by our plant represents a dollar value large enough to pay the total payroll of our plant for approximately 15 weeks.

It does not take long to realize how important and how costly is each pound of waste made. Fortunately by using the waste standards to check on ourselves and on each operation and by reusing every pound of waste possible we are able to cut down on the loss represented by this waste.

Waste is a problem that requires constant supervision, constant counseling and constant work in order to check the large possible loss. It is a problem that offers large rewards and great satisfaction and merit to the individual who can help to solve it.

Webster defines waste as "worthless", and "unneeded", but another definition is needed for the woolen manufacturing plant, because waste is costly and to us waste means "money."

# New Courses For Textile Curriculum

By
John G. Ferguson

TM 463, better known as seminar to the Clemson Textile School students, is a new senior course required for graduation from Clemson. Seminar meets only one hour each week and is a one credit course, but the seniors taking it, or juniors observing, will soon realize the value of this program. The purpose of the course is to bring about a closer understanding between the industry and the Textile School, as well as acquaint students with the various industrial problems.

Professor T. A. Campbell, Head of the Textile Management Department, is in charge of arranging for top industrial men to give talks on matters which are of importance and interest to use in the textile field. Thus far Donald Marshall, Division Manager of Draper Corporation, spoke on "Recent Loom Developments," and J. W. Jelks, Director of Industrial Relations for J. P. Stevens and Company, Inc., discussed "College Recruiting." Those students who were not present for Mr. Jelk's talk missed many valuable points on what companies are looking for in the textile industry. Mr. Fred Dent, President of Mayfair Mills was the third of thirteen speakers to be presented this semester. Mr. Dent's speech "The Textile Industry—State and National" covered the past, present, and future of our industries, problems and achievements.

The fourth speaker, Mr. Robert M. Jones of Saco-Lowell Research and Development Center made a very interesting talk on "Research in Textile Machinery" on October 18, 1960.

The Textile Seminar has been sanctioned by the South Carolina Manufacturers Association, The Sirrine Foundation, and the American Cotton Manufacturers Institute. Gaston Gage, Dean of Clemson Textile School and Robert C. Edwards, President of Clemson College, have stated that many leading men in the textile industry have endorsed this program.

## New Book Review

By
**William E. Barrineau, Jr.**

TITLE: Fabric Structure and Analysis
AUTHORS: E. F. Cartee, J. C. Hubbard, Jr.

The purpose of this book is to acquaint the student who has a background of the foundation weaves, basic operation of different types of looms, and an elementary knowledge of fabric and yarn calculations, with the mechanics of applying this information to the development of fabrics. This may be accomplished in one of two ways. First, basic information such as constructions and yarn counts currently used by the producing organization are known. This, in conjunction with a sketch by a commercial artist or a sample to be reproduced, would be sufficient information for the production of a fabric which, in appearance, resembles the original. The second method is the actual analysis of a given fabric in order that this fabric may be reproduced the same as the original.

Generally, all the information for the reproduction of a fabric, from the original concept by a commercial artist or analyst, to the number of yards of cloth expected per pound of cloth, may be secured from a problem when carried to its completion. The information may be then forwarded to the appropriate department for use.





## Phi Psi Iota Chapter News

By
**Orren F. Hunter, Secretary**

Iota Chapter began its new school year under the leadership of a new faculty advisor, Mr. David E. Gentry. Mr. Gentry succeeded Mr. E. A. LaRoche who resigned in May 1960. Mr. Gentry is a graduate of Clemson College and the Institute of Textile Technology, Charlottesville, Virginia. He formerly worked with West Point Manufacturing Company before accepting his present position on the Research Staff of the Clemson School of Textiles.

The first few regular meetings of Iota Chapter were concerned with making plans for the new school year. Topics of discussion were field trips, drop-ins, banquets, homecoming display and etc. The first banquet was held on October 31 at the Clemson House. The members of the fraternity, along with several members of the Textile School faculty, enjoyed a most delightful meal.

Iota Chapter is now in the process of taking in new members. New members that have accepted invitations are as follows:

Alman, Willie A.
Arnold, David A.
Bevill, John D.
Buchanan, Kenneth R.
Eubanks, Charlie E.
Guthrie, Norman C.
Hartzog, Robert C.
Holley, Clifton B.
Love, Thomas C.
Palassis, Constantine N.
Patrick, William L.
Templeton, Thomas W.
Wallace, David A.

## A. A. T. C. C. News

By
Bruce Evans

The American Association of Textile Chemists and Colorists is an organization of all textile chemists from all over the nation. Through this organization chemists from various related fields present their research to their fellows.

The Association publishes a bi-weekly magazine, **The American Dyestuff Reporter,** which is widely circulated in the trade. Technical articles are present in each issue. Also, an annual yearbook is published, listing all new chemical and physical tests, a tabulation of American dyes, and a complete listing of textile specialties and chemical aids. These publications are invaluable reference works to the textile chemist.

Conventions held by the A. A. T. C. C. include a national convention, this year to be held in Philadelphia, and regional conventions, the nearest of which was held in Charlotte this month.

The Clemson student chapter of A. A. T. C. C. meets on the second and fourth Tuesdays of each month at 7:30 p.m. in the Phi Psi Lounge of the Textile Building. Officers for the year include Bobby Neal of Rock Hill, President; Terry Hunt of York, Vice-President; Stanley Rose of Camden, Secretary; and Tommy Templeton of Greenwood, Treasurer. Mr. Joseph Lindsay is faculty advisor.

The Clemson chapter has already visited the nearby Utica-Mohawk Finishing Plant this year, and several more field trips to various plants in the textile chemists's field are planned. All textile chemistry students, including freshmen, are invited and urged to attend the meetings on the second and fourth Tuesdays of each month.



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